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Department of Energy

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DOE-0249-98

**Mr. James A. Saric, Remedial Project Manager
U.S. Environmental Protection Agency
Region V-SRF-5J
77 West Jackson Boulevard
Chicago, Illinois 60604-3590**

**Mr. Tom Schneider, Project Manager
Ohio Environmental Protection Agency
401 East 5th Street
Dayton, Ohio 45402-2911**

Dear Mr. Saric and Mr. Schneider:

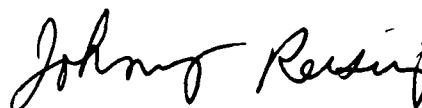
SUBJECT: TRANSMITTAL OF: 1) RESPONSES TO U.S. ENVIRONMENTAL PROTECTION AGENCY AND OHIO ENVIRONMENTAL PROTECTION AGENCY COMMENTS ON THE RE-INJECTION DEMONSTRATION TEST PLAN AND 2) RESPONSES TO U.S. ENVIRONMENTAL PROTECTION AGENCY COMMENTS ON THE PROJECT SPECIFIC FOR THE INSTALLATION OF EXTRACTION WELL 22

- References:**
- 1) Letter, Saric to Reising, "Re-Injection Test Plan," dated September 24, 1997.**
 - 2) Letter, Schneider to Reising, "Comments: Re-injection Demonstration Test Plan," dated October 6, 1997.**
 - 3) Letter, Saric to Reising, "Extraction Well 22 PSP," dated September 24, 1997.**

This letter serves to submit the subject responses for your review and approval. The comments were provided in the above listed references. Only the responses to comments are being submitted at this time. Once agency concurrence on the comment responses and associated actions is received, the Re-Injection Demonstration Test Plan will be submitted in final form. No revision to the Project Specific Plan for the Installation of Extraction Well 22 is required.

Should you have any questions regarding this submittal please contact John Kappa at (513) 648-3149.

Sincerely,



Johnny W. Reising
Fernald Remedial Action
Project Manager

FEMP:Kappa

Enclosures: As Stated

cc w/encs:

N. Hallein, EM-42/CLOV
G. Jablonowski, USEPA-V, 5HRE-8J
R. Beaumier, TPSS/DERR, OEPA-Columbus
M. Rochotte, OEPA-Columbus
T. Schneider, OEPA-Dayton (total of 3 copies of encs.)
M. Davis, ANL
F. Bell, ATSDR
D. S. Ward, GeoTrans
R. VandegriHSI ft, ODOH
F. Barker, Tetra Tech
D. Carr, FDF/52-2
T. Hagen, FDF/65-2
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cc w/o encs:

R. Heck, FDF/2
S. Hinnefeld, FDF/2
EDC, FDF/52-7

**RESPONSES TO U.S. EPA COMMENTS
ON THE PROJECT SPECIFIC PLAN (PSP)
FOR THE INSTALLATION OF EXTRACTION WELL 22**

**FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO**

DECEMBER 1997

**U.S. DEPARTMENT OF ENERGY
FERNALD AREA OFFICE**

**RESPONSE TO U.S. EPA COMMENTS ON THE PROJECT SPECIFIC PLAN
FOR THE INSTALLATION OF EXTRACTION WELL 22**

1. Commenting Organization: U.S. EPA Commentor: Saric
Section#: 3 Pg. #: Not Applicable (NA) Line#: NA Code:
Original Comment# 1

Comment: The "Project Specific Plan for the Installation of Extraction Well 22" (PSP) discusses procedures for well development. However, the PSP does not include information on the pump capacity or the procedures for discharging the development water and the water generated during the pumping test period. The PSP should be revised to present this information.

Response: Extraction Well #22 has already been installed and developed, so it is not necessary to revise the PSP. Specifics concerning how the well was developed are presented below.

During development, Well #22 was pumped at a rate of 100 gpm for two hours, 200 gpm for two hours, and finally 400 gpm for two hours. Upon completion of each time step, a water sample of the pumped groundwater was collected and analyzed for total uranium. The results were 457 $\mu\text{g/L}$, 406 $\mu\text{g/L}$, and 400 $\mu\text{g/L}$ respectively. Results of the sand content testing for each rate step indicated that the sand content was below 10 ppm.

The size of the temporary discharge line limited how high the well was pumped during development. A flexible temporary 4-inch diameter hose was connected between the well and the South Plume Force Main. The pump used to develop Well #22 could only get up to approximately 400 gpm due to the length of the small diameter discharge hose and the surface friction that had to be overcome within the hose. A high pumping rate of 400 gpm during development was considered adequate though, because the proposed pumping rate for Well #22, per the BRSR, is 200 gpm.

Action: No revision to the PSP required.

2. Commenting Organization: U.S. EPA Commentor: Saric
Section#: 3.2 Pg. #: 4 Line#: 6 through 12 Code:
Original Comment# 1

Comment: The PSP states that the well screen will be placed such that it is submerged during the remediation to prevent iron fouling. Prevention of iron fouling may be difficult to achieve if the native aquifer material will be allowed to collapse around the screen. Native aquifer material contains fines that will tend to blind the screen. Additionally, iron bacteria present in the aquifer will contribute to screen blinding and fouling. Screen blinding and fouling will increase the head loss through the screen, thereby lowering the operating liquid level inside the well further below the top of the screen and exposing the screen on the inside of the well. The Department of Energy (DOE) should consider using an alternative screen material that is resistant to iron bacteria accumulation and should select a filter pack material to minimize screen blinding by fines. The PSP should be revised accordingly.

Response: This comment focuses on several issues concerning screen plugging: 1) it may be difficult to prevent iron fouling; 2) plugging of the well screen due to fines; 3) plugging of the well screen due to iron bacteria; 4) use of a different material for the well screen; and 5) having the PSP provide for the use of an artificial filter pack.

In response to the first issue, DOE agrees with the commentor that prevention of iron fouling may be difficult to achieve. The PSP states that "An objective of screen

placement will be to keep the top of the well screen submerged during remediation in order to *assist in preventing* iron fouling of the screen."

In response to issue 2, the well will be properly designed and developed to reduce the possibility that the screen will plug due to the presence of fine grain material within the aquifer. In the case of Well 22, the well was designed using an artificial filter pack. The selection of the filter pack material was based on sieve analysis results from the finest grain sized material present in the depth interval being targeted for the well screen, consistent with industry standards. The well was developed by surging and pumping. During the pumping, a centrifugal sand sampler was used to measure the concentration of fines in the water being pumped from the well. Proper development is considered the best defense against clogging of the well screen due to fine sediment.

In response to issue three, iron bacteria is naturally present in the Great Miami Aquifer. Efforts are being taken to monitor for the development of adverse iron bacteria conditions in all of the extraction wells operated at the FEMP. Lessons learned from the operation and rehabilitation of the South Plume wells will be applied to each new extraction well. It is anticipated though, that the degree of iron fouling experienced in the South Plume Wells will not be experienced in the extraction wells planned for the South Field Area, including Well #22. The basis for this is that iron concentrations in the aquifer beneath the South Field Area are much lower than those in the South Plume Area.

In response to issue 4, stainless steel was selected for the well screen because it is believed that stainless steel will hold up better during maintenance activities than other materials might.

In response to issue 5, the PSP does provide for the use of an artificial filter pack should it be deemed appropriate. The provision can be found in Section 3.2 which reads, "Based on the results of the sieve analysis, the FDF Technical Lead may determine that an artificial sand pack is required for proper design of the well."

Action: No revision to the PSP required.

3. Commenting Organization: U.S. EPA
Section#: 3.3.3 Pg.#: 5
Original Comment# 2

Commentor: Saric

Line#: Item 2

Code:

Comment: The PSP states that the pumping test will be conducted by pumping the well for 2 hours at a rate of one-third of the design capacity. However, the PSP does not state the design capacity of the well. The PSP should be revised to clearly state the design capacity of this well.

Response: Design capacity refers to the pumping rate required to remediate the aquifer, based on modeling for the baseline aquifer remedy presented in the Baseline Remedial Strategy Report (BRSR). For Well #22 the baseline remedial pumping rate is 200 gpm. Therefore, a well that yields at least 200 gpm is required at this location.

Action: No revision to the PSP required.

4. Commenting Organization: U.S. EPA Commentor: Saric
 Section#: 3.3.3 Pg. #: 6 Line#: Item 4 Code:
 Original Comment# 3
 Comment: The PSP states that the pumping rate will be increased to two-thirds of the pump design capacity but does not specify the pump design capacity. The PSP should be revised to clearly state the pump design capacity.
 Response: Clarification of the term "design capacity" is provided in the response to Comment 3. For development of Well #22, the pump that the drillers provided would not go down to a pumping rate as low as 1/3 of the 200 gpm design rate (approximately 67 gpm). So pumping during development began at 100 gpm. It was also decided that it would be good to develop Well #22 at a rate higher than 200 gpm, to provide for higher pumping rates at this location should it ever be deemed beneficial. Therefore, during development, Well #22 was also pumped for two hours at 200 gpm, and for two hours at 400 gpm.
 Action: No revision to the PSP required.
5. Commenting Organization: U.S. EPA Commentor: Saric
 Section#: 3.3.3 Pg. #: 6 Line#: Item 7 Code:
 Original Comment# 5
 Comment: The PSP states that the pumping rate will be increased to the design capacity of the pump. However, the PSP does not specify the design capacity of the pump. Additionally, the reference to "the measurements in 4 and 5 above" should be changed to read "the measurements in 2 and 3 above."
 Response: Clarification of the term "design capacity" is provided in the response to Comment 3. The typo concerning "4 and 5 above" actually being "2 and 3 above" was caught and corrected by the field crew prior to development of Well #22. Since development has been completed, there is no need to revise the PSP.
 Action: No revision to the PSP required.
6. Commenting Organization: U.S. EPA Commentor: Saric
 Section#: 3.3.3 Pg. #: 6 Line#: Item 7 Code:
 Original Comment# 5
 Comment: The PSP states that water level measurements will be taken every 30 seconds during the well recovery period. It is not clear what equipment will be used to obtain these water level measurements. The text should discuss the type of equipment that will be used to measure the water level of 30 seconds.
 Response: A down hole transducer and data logger system was used to collect water level measurements during development. Since development of the well has already taken place, a revision to the PSP is not required.
 Action: No revision to the PSP required.
7. Commenting Organization: U.S. EPA Commentor: Saric
 Section#: 5 Pg. #: 8 Line#: NA Code:
 Original Comment# 6
 Comment: The PSP states that the discharged pumping water will be sent to the South Plume Main; however, no discharge piping, valves, flow meters, and so forth are discussed in the text or shown in the figures. The text should be revised to discuss and an additional figure should be included to show the discharge piping and required controls to be used for the pumping test.

Response: As stated earlier, Well #22 has been installed and developed. Below is an explanation of the set up which was used to discharge the pumped water to the South Plume Force Main.

A development pump was installed into the well. The pump was discharged into a straight section of pipe equipped with a control valve and a digital flow meter. The straight section of pipe was connected to a four inch diameter, high pressure rated, vinyl coated flexible hose which was in turn connected to the South Plume Force Main. This is the same set-up which was used to develop the other nine South Field Extraction Wells.

Action: No revision to the PSP required.